INL expands supercomputing power

IDAHO FALLS — Idaho National Laboratory has installed a new 12,512-processor supercomputer — known as "Fission" — that is six times more powerful than its predecessor, Icestorm, which came online in 2007.

The acquisition of Fission, an Appro Xtreme-X™ supercomputer based on AMD Opteron™ processors, enables INL researchers to build more complete scientific models and better predict outcomes for a variety of nuclear and energy-related issues.

For example, an INL team is using Fission to simulate what happens to the metal cladding that surrounds uranium fuel in a nuclear reactor. Fission helped create a 3-D fuel rod model that simulates how heat, pressure and other conditions affect cladding during its first 18 months in a reactor – a first for the team.

"Fission is a very capable supercomputer that enables increased fidelity in modeling and simulation of complex systems and processes. Scientists and engineers at INL as well as other researchers are already making use of the greatly increased capability," said Eric Whiting, interim director of Idaho National Laboratory's Center for Advanced Modeling and Simulation.

Derek Gaston, a Computational Applied Mathematician who worked on the fuel rod project, said Fission already is advancing nuclear energy research at INL.

"Fission is enabling us to simulate things we couldn't before," he said. "With Fission, we have been able to simulate a real fuel rod in a real reactor. We haven't had the computing power to do that until now."

Fission has achieved a peak speed of 91 teraflops, which means it can perform 91 trillion floating point calculations per second. (Fission's size and speed is equivalent to systems that were ranked in the top 100 fastest supercomputers in the world according to a November 2010 list issued by Top 500, an independent organization).

Brent Stacey, INL Chief Information Officer, believes that investing in capacity to support our core modeling and simulation capability is vital to INL's continued success.

"Technology changes quickly and our continued strategic investment in high-performance computing enables INL researchers with access to vital capabilities," Stacey said. "The world class programs at the laboratory require state of the art computing resources."

INL is leasing Fission from Appro.

"INL is dedicated to elevate the competitiveness of supercomputer performance to improve and develop modeling and simulations of nuclear reactors," said Daniel Kim, CEO of Appro. "We are very proud to work with INL to provide innovative and advanced supercomputing solutions."

INL is one of the DOE's 10 multiprogram national laboratories. The laboratory performs work in each of the strategic goal areas of DOE: energy, national security, science and environment. INL is the nation's leading center for nuclear energy research and development.

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